

DOCKET NO: V0191.70035US00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Edward Budowsky, et al.
Serial No: Not yet assigned
Confirmation No: Not yet assigned
Filed: Herewith
For: METHODS AND COMPOSITIONS FOR THE SELECTIVE
MODIFICATION OF NUCLEIC ACIDS

MAIL STOP PATENT APPLICATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

STATEMENT FILED PURSUANT TO THE DUTY OF
DISCLOSURE UNDER 37 CFR §§1.56, 1.97 AND 1.98

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement.

PART I: Compliance with 37 C.F.R. §1.97

This Information Disclosure Statement has been filed before the mailing date of a first Office Action on the merits in the above-identified case.

No fee or certification is required.

PART II: Information Cited

The Applicant hereby makes of record in the above-identified application the information listed on the attached form PTO-1449 (modified). The order of presentation of the references should not be construed as an indication of the importance of the references.

The Applicant hereby makes the following additional information of record in the above-identified application.

PART III: Explanation of Non-English Language References and Remarks Concerning Other Information Cited

The following is a concise explanation of the relevance of each non-English language reference listed on the attached form PTO-1449 (modified):

The following are remarks concerning the other information cited:

PART IV: Remarks

Documents cited anywhere in the Information Disclosure Statement are enclosed unless otherwise indicated. It is respectfully requested that:

1. The Examiner consider completely the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims;
2. The enclosed form PTO-1449 be signed by the Examiner to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application;
3. The citations for the information be printed on any patent which issues from this application.

By submitting this Information Disclosure Statement, the Applicant makes no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

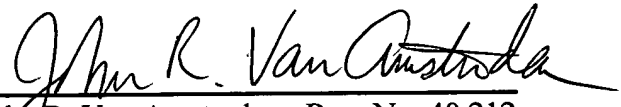
By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. §1.56(b).

By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. §102.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his own conclusion regarding the relevance of the cited information.

An early and favorable action is hereby requested.

Respectfully submitted,
Edward Budowsky, et al., Applicant


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Date: September 3, 2003
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FORM PTO-1449/A and B (Modified) INFORMATION DISCLOSURE STATEMENT BY APPLICANT				APPLICATION NO.: Not yet assigned		DOCKET NO.: V0191.70035US00			
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U.S. PATENT DOCUMENTS

Examiner's Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication or of issue of Cited Document MM-DD-YYYY
		Number	Kind Code		
	*A1	US 3,487,157		Pierce, et al.	12/30/1969
	*A2	US 3,636,196		Bauer, et al.	01/18/1972
	*A3	US 4,429,045		Bass, et al.	01/31/1984
	*A4	US 5,547,576		Onishi , et al.	08/20/1996
	*A5	US 5,691,132		Wollowitz , et al.	11/25/1997
	*A6	US 5,891,705		Budowsky , et al.	04/06/1999
	*A7	US 6,093,564		Budowsky , et al.	07/25/2000
	*A8	US 6,093,725		Cook , et al.	07/25/2000
	*A9	US 6,114,108		Budowsky	09/05/2000
	*A10	US 6,136,586		Budowsky	10/24/2000
	*A11	US 6,143,490		Cook , et al.	11/07/2000
	*A12	US 6,171,777		Cook , et al.	01/09/2001
	*A13	US 6,177,441		Cook , et al.	01/23/2001
	*A14	US 6,331,387 (withdrawn patent)		Hei, et al.	12/18/2001
	*A15	US 6,352,695		Budowsky , et al.	03/05/2002
	*A16	US 6,410,219		Cook , et al.	06/25/2002
	*A17	US 4,567,042		Acree, et al.	01/28/1986
	*A18	US 6,369,048		Budowsky, et al.	04/2002
	*A19	US 5,000,951		Bass et al.	03/19/1991
	*A20	US 5,559,250		Cook et al.	09/24/1996
	*A21	US 5,055,485		Geacintov et al.	10/08/1991
	*A22	US 5,120,649		Horowitz et al.	06/09/1992
	*A23	US 5,232,844		Horowitz et al.	08/03/1993
	*A24	US 4,841,023		Horowitz	06/20/1989
	*A25	US 5,374,424		Kelsey et al.	12/20/1994
	*A26	US 5,698,432		Oxford	12/16/1997
	*A27	US 5,418,130		Platz, et al.	05/23/1995
	*A28	US 4,784,992		Reiner	11/15/1988
	*A29	US 3,492,289		Symm et al.	01/27/1970
	*A30	US 4,098,726		Wagner et al.	06/04/1978
	*A31	US 4,161,581		Wagner et al.	07/17/1979
	*A32	US 4,206,295		Wagner et al.	06/03/1980

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FOREIGN PATENT DOCUMENTS

Examiner's Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document (not necessary)	Date of Publication of Cited Document MM-DD-YYYY	Translation (Y/N)
		Office/Country	Number	Kind Code			
	*B1	EP	EP 0 476 711	A2, A3	Nakai, et al.	03/25/1992	
	*B2	JP	JP 6-805520	A	Ohwada, et al.	03/22/1994	Yes
	*B3	WO	WO 96/14737	A1	Cook, et al.	05/23/1996	
	*B4	WO	WO 96/39820	A1	Hei, et al.	12/19/1996	
	*B5	WO	WO 97/07674	A1	Budowsky, et al.	03/06/1997	
	*B6	WO	WO 97/21346	A1	Wollowitz, et al.	06/19/1997	
	*B7	WO	WO 98/45415	A1	Budowsky, et al.	10/15/1998	
	*B8	WO	WO 99/17802	A1	Budowsky, et al.	04/14/1999	
	*B9	SU	1809836	A3	Soviet Union; English Translation	04/15/1993	Yes
	*B10	EP	0612532	A2	Europe	08/31/1994	
	*B11	JP	53-82735		Japan; English abstract	07/21/19978	
	*B12	RO	101400		Romania; English abstract	04/12/1992	
	*B13	SU	594771	A1	Soviet Union; English translation	07/07/1993	Yes
	*B14	SU	1768636	A1	Soviet Union; English translation	10/15/1992	Yes
	*B15	WO	92/03157		PCT	03/05/1992	
	*B16	WO	92/04031		PCT	03/19/1992	
	*B17	WO	92/18161		PCT	10/29/1992	
	*B18	WO	16/39818		PCT	12/19/1996	

OTHER ART — NON PATENT LITERATURE DOCUMENTS

Examiner's Initials	Cite No	Include name of the author (in CAPITAL LETTERS) title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, relevant page(s), volume-issue number(s), publisher, city and/or country where published.	Translation (Y/N)	
	*C1	Amor, S., and H.E.Webb, "Use of N-Acetyleneimine [AEI] for the inactivation of Semliki Forest Virus in vitro" J Medical Virology 19:367-376 (1986)		
	*C2	Atwell, G.J. et al.. "Synthesis, DNA Interactions and Biological Activity of DNA Minor Groove Targeted Polyberizamide-linked Nitrogen Mustards," Bloorg Med. Client. 1995 Jun; 3(6):679-91		
	*C3	Briel, S. et al Identification of New Aqueous Chemical Degradation Products of Isophosphoramide Mustard J Pharm Biomed Anal. 2001 Jun;25 (3-4): 669-78.		
	*C4	Budowsky, E.I., "Problems and prospects for preparation of killed antiviral vaccines" Adv. Virus Res. 39:255-90 (1991)		
	*C5	Charache, S. et al.. "Evaluation of Extracorporeal Alkylolation of Red Cells as a Potential Treatment for Sickle Cell Anemia," Blood 1976; 47(3):481-88		
	*C6	Danao, T. et al., "Nitrogen Mustard as Induction Therapy for Rheurnatoid Arthritis: Clinical and Immunologic Effects." J. Rheum. 1992 19:1683-86		
	*C7	Drake, M.E. et al., "Effect of Nitrogen Mustard on Virus of Serum Hepatitis in Whole Blood." Proc. of Soc. Exp. Rio. Med. 1952(80)310-13		
	*C8	Ferguson, L.R. et al.. "DNA-directed Aniline Mustards with High Selectivity for Adenine or Guanine Bases: Mutagenesis in a variety of Salmonella Typhimurium Strains Differing in DNA-		

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		Repair Capability, " Mutat Res. 1994 Apr; 321(1-2):27-34		
	*C9	Ferguson, L.R. et cal.. "Bacterial Mutagenicity Studies of DNA-Intercalating Aniline Mustards: an Insight Into the Mode of Action of a Novel Class of Anti-Tumor Drugs," Anticancer Drug Des. 1989 Oct; 4(3):209-19		
	*C10	Fries, K.M. et al 31P NMR and Chloride Ion Kinetics of Alkylating Monoester Phosphoramidates J. Med. Chem 1991 Feb;34(2): 565-9		
	*C11	Gao, Yi-Gui; Sriram, M. et cal.. "Minor Groove Binding of SN6999 to an Alkylated DNA: Molecular Structure of d(CGC[e6G]AATTCGCG)-SN6999 Complex," Biochemistry 1993, Sep 21; 32(37):9639-48		
	*C12	Gourdie T.A. et al.. "DNA-directed Alkylating Agents. 1. Structure-activity Relationships for Acridine-linked Aniline Mustards: Consequences of Varying the Reactivity of the Mustard," J. Med. Chem. 1990 Apr; 33(4):1177-86		
	*C13	Gourdie T.A. et al.. "Synthesis and Evaluation of DNA-targeted Spatially Separated Bis(Aniline Mustards) as Potential Alkylating Agents with Enhances DNA Cross-linking Capability," J. Med. Chem. 1991 Jan; 34(1):240-8		
	*C14	Gravatt, G.L. el al., "DNA-directed Alkylating Agents. 6. Synthesis and Antitumor Activity of DNA Tumor Groove-targeted Aniline Mustard Analogues of Pibenzimol," J. Med. Chem.. 1994 Dec. 9; 37(25): 4338-45		
	*C15	Gravatt, G.L. et al.. "DNA-Directed Alkylating Agents 4. 4-Anilinoduinoiline-Based Minor Groove Directed Aniline Mustards," J. Med Chem 1991, 34(5):1552-60		
	*C16	Griffin M.T. et al Kinetics of Activation and in Vivo Muscarinic Receptor Binding of N-(2-bromoethyl)-4-Piperidiny Diphanylacetate: an Analog of 4-DAMP Mustard J. Pharmacol Exp Ther 1993 Jul; 266(1) 301-5.		
	*C17	Hamza, A. Quantum Molecular Modeling of the Interaction Between Guanine and Alkylating Agents—2-Nrogen Mustard J. Biomol Struct Dyn 1996 Jun; 13(6):915-24		
	*C18	Hartman, F.W. et al., "Preparation and Sterilization of Blood Plasma." Ant. J. Clin. Path, 1954(24); 339-48		
	*C19	Hartman, F.W. et al.. "On the Chemical Sterilization of Blood and Blood Plasma." Proc. of Soc.. Exp. Bio. Med. 1949;70:248-54		
	*C20	Hartman, F.W., et al.. "Four-Year Study Concerning the Inactivation of Viruses in Blood and Plasma," Presented at the 55th Annual Meeting of the American Gastroenterological Association, San Francisco, California, June 1954		
	*C21	Hassanain, M.M., "Preliminary findings for an inactivated African horsesickness vaccine using binary ethyleneimine" Revue Elev. Med. Vet. Pays Trop. 45: 231-234 (1992)		
	*C22	Hemminki, K. "DNA Adducts of Nitrogen Mustards and Ethyleneimines" DNA Adducts: Identification and Biological Significance, IARC Scientific Publications No. 125, Editors: Hemminki, et al., 1994, pp. 313-321.		
	*C23	Hemminki, K. Reactions of Nitrogen Mustards with DNA IARC Sci. Publ 1986; (78):55-70		
	*C24	Knorre, D.G. et al.. "Reactive Derivatives Of Oligonucleotides As Potential Antiviral Drugs," Problems of Virology, 1985, No.5, pp. 524		
	*C25	Kohn, K.W. et al Mechanisms of DNA Sequence Selective Alkylation of Guanine-N7 Positions by Nitrogen Mustards Biochem Pharmacol 1988 May 1; 37(9): 1799-800		
	*C26	Lee, M et al., "In Vitro Cytotoxicity of GC Sequence Directed Alkylating Agents Related to Distamycin," J. Med. Cheer. 1993, Apr 2; 36(7)863-70		
	*C27	Lobastov, A.E., "Use of ethyleneimine dimmer for the inactivation of infectious rhinotracheitis virus of cattle" Probl. Virusol., Mol. Biol. Gistol. S-kh. Zhivotn., pages 4-6 (1983)		

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	*C28	LoGrippe, G.A et al.. "Chemical and Combined Methods for Plasma Sterilization. , 6th Congress of the Int'l Soc. of Blood Trans., 1958, pp. 225-230	
	*C29	Mattes, W.B. et al.. "GC-rich Regions in Genomes as Targets for DNA Alkylation," Carcinogenesis 1988; 9(11):2065-72	
	*C30	Prakish, A.S. et al., "Differences in Sequence Selectivity of DNA Alkylation by Isomeric Intercalating Aniline Mustards," Chem. Biol. Interact. 1990; 76(23):241-8	
	*C31	Price, C.C. et al Relative Reactivities for Monofunctional Nitrogen Mustard Alkylation of Nucleic Acid Components Biochim Biophys Acta 1968 Sep 24; 166(2):327-59	
	*C32	Roth, E.F. Jr. et al., "Metabolic Effects of Antisickling Amounts of Nitrogen and Nor-Nitrogen Mustard on Rabbit and Human Erythrocytes." Blood 1975;45(6):779-88	
	*C33	Springer, J.B. et al Isophosphoramidate Mustard and Its Mechanism of Bisalkylation J. Org. Chem 1998 Oct. 16; 63(21):7218-7222	
	*C34	Valu, K.K. et al., "DNA-directed Alkylating Agents. 3. Structure-activity relationships for Acridine-linked Aniline Mustards: Consequences of Varying the Length of the Linker Chain." J. Med. Chem 1990 Nov; 33(11):3014-9	
	*C35	Verschaeve, L. et al. "Mutagenicity of Ethyleneimine" Mutation Res. 238:39-55 (1990)	
	*C36	Vlasov, V.V. et al., "The Feasibility, Of Blocking Influenza Infections By Means Of Alkylating Derivatives Of Oligonucleotides," Molecular Genetics, Microbiology, And Virology, 1984, No. 11	
	*C37	Warrington, "Derivatives of Aziridine as Inactivants for Foot-and-Mouth Disease Virus Vaccines" Am J. Vet. Res., Vol. 34, No. 8. pp. 1087-1091	
	*C38	Wickham, G. et al., "DNA-binding Properties and Antitumor Activity of Monofunctional Alkylating Groups Attached to the DNA-intercalating Chromophore Phenanthridine: n-Bromoalkylphenanthridinium Bromides," Biochim et Biophysica Acta 1991 1073:528-37	
	*C39	Wilke, W.S. et al., "Parenteral Nitrogen Mustard for Inflammatory Arthritis," Cleveland Clin. J. Med. 1990 Oct; 57(7):643-46	
	*C40	Yamamoto, et al. Cancer Research 26, pt. 1, 2301-2306 (Nov 1966)	
	*C41	Yang, C. et al The Preparation of an Inactivated Antigen for Bluetongue Serology Zentralbl Veterinarmed [B] 1984 May; 31(4); 290-6.	
	*C42	Zalesskaya, M.A., "Inactivation of viral genome by beta-propiolactone and ethyleneimines using the bacteriophage MS-2 as an example," Russian State Library, Moscow, Russia (1988)	
	*C43	Bahnmann, "Inactivation of viruses in serum with binary ethyleneimine" J. Clin. Microbial. 3:209-210 (1975).	
	*C44	Bahnmann, "Inactivation of viral antigens for vaccine preparation with particular reference to the application of binary ethyleneimine" Vaccine, 8:299-303 (1990).	
	*C45	Bieniarz et al., "A facile, high-yielding method for the conversion of halides to mercaptans" Tetrahedron Lett. 34:939-942 (1993).	
	*C46	Budowsky et al., "Inactivation of the phage MS2 infectivity by the action of ethyleneimines" Biorg. Khim. 11:989-991 (1985) (in Russian). English Abstract	
	*C47	Budowsky and Zalesskaya, "Principles and selective inactivation of viral genome. V. Rational selection of conditions for inactivation of the viral suspension infectivity to a given extent by the action of B-propiolactone" Vaccine 9:319-325 (1991)	
	*C48	BUDOWSKY, et al Principles of Selective Inactivation of the Viral Genome; dependence of the Rate of viral RNA Modification on the Number of Protonizable Groups in Ethyleneimine Oligomer Vaccine Res. 5:29-39 (1996)	
	*C49	CREECH et al., Antitumor and mutagenic properties of a variety of heterocyclic nitrogen and	

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		sulfur mustards Med. Chem. 15:739-746 (1972).	
	*C50	DERMER, O.C. and Ham, G.E. (1969) Ethyleneimine And Other Aziridines, Acad. Press, NY-- London 52:249-285.	
	*C51	EARLEY, J.E. et al. (1958) J. Am Chem. Soc. 80:3458-3462.	
	*C52	HEMMINKI, K. Reactions of Nitrogen Mustards with DNA IARC Sci. Publ 1986; (78):55-70	
	*C53	KING, Evaluation of different methods of inactivation of newcastle disease virus and avian influenza virus in egg fluids and serum Avian Diseases 35:505-514 (1991).	
	*C54	KOCHETOV, N.K. and Budowsky, E.I. eds. (1972) p.48-55, Organic Chemistry of Nucleic Acids, Part B, Plenum Press, London-New York.	
	*C55	KOSTYANOVSKII et al., Oligomers of azridines and N-beta-azridinoethylamides, Bull. Acad. Sci. USSR, Div. Chem. Sci., 37:2315-2325 (1989). (Translated from Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya 11:2566-2575.).	
	*C56	O'ROURKE et al, "Reaction of ethylenimines. VIII. Dissociations constants" J. Am. Chem. Soc. 78:2159-2160 (1956).	
	*C57	PRODOUZ et al., Inhibition of merocyanine 540-mediated photosensitization of platelets and viruses Transfusion 31:415-422 (1991).	
	*C58	RACE, E. An Experimental Chemically Inactivated HIV-1 Vaccine Induces Antibodies that Neutralize Homologous and Heterologous Viruses Vaccine 1995, VI 13, No. 1 54-80	
	*C59	STEVENS et al., "Studies on the Interaction of Homologues of Spemine with Deoxyribonucleic Acid and with Bacterial Protoplasts" Biochem J. 103:811-815 (1967).	
	*C60	TANIRBERGENOV, T.B. et al., Regularities of mutagenic and toxic effects of ethyleneimine and its oligomers. A comparative study in the automated system SOS-chromotest and in standard bacterial test systems, Genetika 24:763 (1988) (in Russian). English translation provided, 5 pages.	
	*C61	THANEI-Wyss, Interaction of quaternary ammonium compounds with acetylcholinesterase: characteristics of the active site Eur. J. Pharmacol., Mol. Pharmacol. Sect. 172:165-173 (1989).	
	*C62	THOMAS, et al., "Ionic and Structural Effects on the Thermal Helix-Coil Transition of DNA Complexed with Natural and Synthetic Polyamines" Biopolymers 23:1295-1306 (1984).	
	*C63	TWOMEY et al., Structure and immunogenicity of experimental foot-and-mouth disease and poliomyelitis Vaccine 13:1603-1610 (1995).	
	*C64	VAN ETEN, R.L. and Dolhum, J.J. (1968) J. Org. Chem. 33:3904-3913.	
	*C65	WAGNER, S.J. et al.. Approaches to the Reduction of Viral Infectivity in Cellular Blood Components and Single Donor Plasma. Transfusion Medicine Reviews January 1991; V(1): 18-32	

EXAMINER	DATE CONSIDERED
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#EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

*a copy of this reference is not provided as it was previously cited by or submitted to the office in a prior application, Serial No. 09/212,778, filed December 16, 1998, and relied upon for an earlier filing date under 35 U.S.C. 120 (continuation, continuation-in-part, and divisional applications).